

a partition plate dividing said container into an air-tight process chamber and an air-tight auxiliary chamber, and having a window plate made of dielectric;

a main exhaust pump for exhausting and setting said process chamber to a vacuum;

a work table arranged in said process chamber and having a support face facing said window plate, said substrate being mounted on said support face, with said process region facing said window plate;

a main supply for supplying a process gas between said window plate and said substrate mounted on said support face, at least part of said process gas being transformed into said plasma;

an induction electrode, for generating electromagnetic field between (1) said window plate and (2) said substrate mounted on said support face, to induce generation of said plasma, and including a coil arranged in said auxiliary chamber and facing said window plate;

a power supply section for applying a high frequency voltage to said coil;

an auxiliary exhaust pump for exhausting and setting said auxiliary chamber to a vacuum;

a pressure controller connected to said auxiliary exhaust pump for keeping a pressure difference between pressures in said process and auxiliary chambers at a minimum value; and

a seat arranged on said window plate and supporting said coil;

wherein a passage through which coolant is circulated is formed in said seat.

25. (Amended) An apparatus for processing a process region of a substrate, using a plasma, comprising:

a container substantially formed of a conductive material;

a partition plate supported by said container and defining an air-tight process container portion and an air-tight auxiliary portion, and having a window plate made of dielectric;

a main exhaust pump for exhausting and setting said process container portion to a vacuum;

a work table arranged in said process container portion and having a support face facing said window plate, the substrate being mountable on said support face with the process region facing said window plate;

a main supply for supplying a process gas between said window plate and the substrate mounted on said support face, at least part of the process gas being transformable into the plasma;

a planar spiral coil for generating an electromagnetic field between said window plate and the substrate mounted on said support face to induce generation of the plasma, arranged in said auxiliary container portion and facing said window plate;

a power supply section for applying a high frequency voltage to said planar spiral coil;

an auxiliary exhaust pump for exhausting and setting said auxiliary container portion to a vacuum;

a pressure controller connected to said auxiliary exhaust pump for keeping a pressure difference between pressures in said process and auxiliary container portions at a minimum value; and

a seat arranged in window plate and supporting said planar spiral coil;

wherein a passage through which coolant is circulated is formed in said seat.

77. (Amended) An apparatus for processing a substrate in a plasma comprising:

- a container;
- a dielectric window supported by said container and dividing said container into a first container portion and a second container portion;
- first vacuum means for creating a first vacuum in said first container portion;
- second vacuum means for creating a second vacuum in said second container portion;
- a controller for controlling at least one of said first and second vacuum means in order to control a differential pressure across said window at a minimum value;
- a table arranged in said first container portion for supporting the substrate;
- a first supply for supplying a process gas to said first container portion;
- an planar spiral coil arranged in said second container portion;
- a voltage-supply to said planar spiral coil for generating an electromagnetic field whereby generation of the plasma is induced in said first container portion; and
- a seat arranged in the said window and supporting said planar spiral coil; wherein a passage through which coolant is circulated is formed in said seat.

27. (Amended) An apparatus for processing a process region of a substrate, using a plasma, comprising:

- a container substantially formed of a conductive material;

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a partition plate supported by said container and defining an air-tight process container portion and an air-tight auxiliary container portion, and having a window plate made of dielectric;

an exhaust pump for exhausting and setting at least one of said container portions to a vacuum;

a work table arranged in said process container portion and having a support face facing said window plate, the substrate being mountable on said support face with the process region facing said window plate;

a main supply for supplying a process gas between said window plate and the substrate mounted on said support face, at least part of the process gas being transformable into the plasma;

a planar spiral coil for generating an electromagnetic field between said window plate and the substrate mounted on said support face to induce generation of the plasma, arranged in said auxiliary container portion and facing said window plate;

a power supply section for applying a high frequency voltage to said planar spiral coil;

a pressure controller connected to said exhaust pump for keeping a pressure difference between pressures in said process and auxiliary container portions at a minimum value;

an auxiliary supply for supplying an inactive gas into said auxiliary container portion; and

a seat arranged on said window plate and supporting said planar spiral coil;

wherein a passage through which coolant is circulated is formed in said seat.

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